

WHAT IS CLAIMED IS:

1. A method for acquiring a public land mobile network (PLMN) of a mobile station for registering the mobile station in a cell overlapped operated by a first business operator with a cell of a base station operated by a second business operator, the method comprising the steps of:

(i) scanning a plurality of slot synchronizations having different signal strengths using a previously set carrier frequency;

(ii) determining whether a corresponding base station is operated based on home PLMN information included in system information in response to a slot synchronization having a strongest signal strength;

(iii) extracting cell overlapped information from the system information when the corresponding base station is not operated based on the home PLMN, the cell overlapped information indicating that a base station is overlapped with the base station operated by the second business operator; and

(iv) re-executing a PLMN acquisition procedure for different slot synchronizations with respect to an identical frequency based on the cell overlapped information.

2. The method as defined in claim 1, wherein the cell overlapped information includes a timing offset and a scrambling code for demodulating a PLMN overlapped with a base station in a different network, which uses the frequency of the home base station.

3. The method as defined in claim 2, wherein step (iv) further comprises directly acquiring the home PLMN using the timing offset and the scrambling code.

4. The method as defined in claim 1, wherein the cell overlapped information includes information as to whether overlapped areas are present.

5. The method as defined in claim 4, wherein step (iv) comprises:
 (iv-1) acquiring frame synchronizations of different slot synchronizations having signal strengths weaker than the strongest signal strength of the slot synchronization;
 (iv-2) extracting a scrambling code using the frame synchronizations acquired in
5 step (iv-1); and
 (iv-3) acquiring system information provided from the home base station using the scrambling code extracted in step (iv-2).
6. The method as defined in claim 1, wherein the cell overlapped
10 information includes number information of an overlapped PLMN.
7. The method as defined in claim 6, wherein step (iv) comprises:
 (iv-1) acquiring frame synchronizations of different slot synchronizations having signal strengths weaker than the strongest signal strength of the slot synchronization;
15 (iv-2) extracting a scrambling code using the frame synchronizations acquired in step (iv-1); and
 (iv-3) acquiring system information provided from the home base station using the scrambling code extracted in step (iv-2), by a number of the PLMN.
- 20 8. The method as defined in claim 1, wherein the cell overlapped information includes identification information of a PLMN forming an overlapped cell.
9. The method as defined in claim 8, step (iv) comprises:
 (iv-1) acquiring frame synchronizations of different slot synchronizations with
25 respect to an identical frequency having signal strengths weaker than the strongest signal strength of the slot synchronization;
 (iv-2) extracting a scrambling code using the frame synchronizations acquired in step (iv-1); and
 (iv-3) acquiring system information provided from the home base station using
30 the scrambling code extracted in step (iv-2).

10. A method for providing public land mobile network (PLMN) information of a base station operated by a first business operator having a cell which is overlapped with a cell of a base station operated by a second business operator using an identical frequency, the method comprising the steps of:

- 5 (c) producing system information;
(b) producing cell overlapping information indicating that the base station is overlapped with the base station operated by the second business operator;
(c) adding the cell overlapping information to the system information; and
(d) broadcasting the system information including the cell overlapped
10 information.

11. The method as defined in claim 10, wherein the cell overlapped information includes at least one of (i) a timing offset and a scrambling code for demodulating a PLMN overlapped with a base station in a different network using the
15 frequency as that of the home base station, (ii) information as to whether overlapped areas are present, (iii) number information of an overlapped PLMN, and (iv) identification information of a PLMN forming an overlapped cell.

12. The method as defined in claim 10, wherein step (b) comprises:
20 (b-1) receiving timing difference information from a mobile station which is located in an identical cell of the base station operated by the first business operator; and
(b-2) extracting a timing offset using the timing difference information.

13. The method as defined in claim 12, wherein step (c) comprises:
25 (c-1) adding the timing offset and a scrambling code to the system information.

14. A mobile station having a home public land mobile network (PLMN) function for registering a mobile station in a cell operated by a first business operator overlapped with a cell of a base station operated by a second business operator, the
30 mobile station comprising:

a controller for acquiring system information corresponding to a slot synchronization having a strongest signal strength among a plurality of acquired slot synchronizations using a previously set carrier frequency during an acquisition of the PLMN;

5 extracting PLMN information from the acquired system information;
 determining whether a corresponding base station is a home PLMN based on the extracted PLMN information;

 determining whether cell overlapped information is included in the system information when the corresponding base station is not the home PLMN, wherein the cell
10 overlapped information indicates that a base station is overlapped with the base station operated by the second business operator; and

 executing a PLMN acquisition procedure for different slot synchronizations based on the cell overlapped information.

15 15. The mobile station as defined in claim 14, wherein the cell overlapped information includes information as to whether overlapped areas are present, and the controller acquires frame synchronizations of different slot synchronizations having signal strengths weaker than the strongest signal strength of the slot synchronization and acquires a scrambling code based on the frame synchronizations in order to acquire
20 system information, during the acquisition of the PLMN.

 16. The mobile station as defined in claim 14, wherein the cell overlapped information includes number information of an overlapped public land mobile network, and the controller repeats the step of acquiring frame synchronizations for each slot
25 synchronization by a number of the overlapped PLMNs among different slot synchronizations having signal strengths weaker than the strongest signal strength of the slot synchronization, and the step of acquiring a scrambling code based on the acquired frame synchronizations in order to acquire the system information, during the acquisition of the PLMN.

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17. The mobile station as defined in claim 14, wherein the cell overlapped information includes a timing offset and a scrambling code for demodulating a PLMN overlapped with a base station in a different network using the frequency of the home base station, and the controller acquires system information based on the timing offset
5 and the scrambling code in order to directly acquire the home PLMN during the acquisition of the PLMN.

18. The mobile station as defined in claim 14, wherein the cell overlapped information includes PLMN information having frequency information of each base
10 station forming the overlapped cell, and the controller selects a slot synchronization to which a frequency included in the PLMN information belongs, acquires a frame synchronization for the selected slot synchronization, and acquires a scrambling code based on the acquired frame synchronization in order to acquire the system information,
during the acquisition of the PLMN.

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